IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of

HOWARD et al. Atty. Ref.: 839-1540; Confirmation No. 7851

Appl. No. 10/825,185 TC/A.U. 2858

Filed: April 16, 2004 Examiner: TERESINSKI, John

For: A CAPACITIVE SENSOR AND METHOD FOR NON-CONTACTING GAP AND DIELECTRIC MEDIUM MEASUREMENT

* * * * * * * * * * * *

September 13, 2006

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

PRE-APPEAL BRIEF

Applicants submit this brief for the pre-appeal panel review requested in the concurrently filed notice of appeal.

The rejection of claims 1 to 3, 6, 10 to 12, 24 to 26, 28, 33, 34 and 37 as being obvious over Muller (Patent Publication 2002/0070729) in view of U.S. Patent 4,058,765 (Richardson et al) should be reversed.

Claims 1, 10, 24 and 28 are independent. They require a magnitude of a displacement (such as a gap or width) to be determined by a non-contact sensor.

Representative claim 1 is as follows:

> 1. A method for non-contact measurement of a displacement between a surface and a capacitive sensor comprised of at least two superimposed conductive plates electrically insulated one from the

> other and a sensor circuit coupled to the plates, said method comprising:
>
> (a) positioning said capacitive sensor proximate to the surface such that the displacement is a distance of a gap between the surface and one of the plates;
>
> (b) **applying a high frequency signal to the plates;**
>
> (c) **applying the high frequency signal and a signal from a sensor plate of the conductive plates to control a voltage gain of an amplifier in the circuit**, said signal from the sensor plate being indicative of the displacement between the sensor and the surface;
>
> (d) differentiating an output of the amplifier and the high frequency signal, and
>
> (e) **determining a magnitude of the displacement based on the difference between the output of the amplifier and the high frequency signal**. (Emphasis Supplied).

In the claimed system, a high frequency input signal and a signal from the sensor plate control the gain of an amplifier. In the claimed system, there is no need for two output signals because the system uses one output signal indicative of a capacitance across a gap and the input signal to measure gap displacement. The prior art teaches that two output signals are needed to determine a gap. The Richardson et al and Muller circuits measure two output capacitances and take the difference between these two outputs to detect or measure a displacement. The rejection does not make a prima facie case for obviousness because the prior art teaches away from applying an input and output signal together to control an amplifier gain to determine a displacement.

Muller does not disclose applying a signal from a sensor plate and an input signal to control the gain of an amplifier. Muller applies output signals from two coils 3, 4 to the inputs of a differential amplifier 5. Muller does not control the gain of an amplifier. Muller senses the amount of signal which is capacitively coupled onto a measurement plate. Capacitance between the measurement plate and the target material reduces the coupled signal amplitude which is measured by an operational amplifier (Op Amp) Muller para. 0031. Muller does not suggest

controlling the gain of the amplifier with the output signals of either coil or combining an input signal and an output signal to control an amplifier.

The circuit disclosed in Richardson et al does differentiate the input signal and the output signal of the sensor plate, as is done in the claimed invention. The circuit in Richardson et al applies a pulse train to two separate output capacitances (C_1, C_6), and measures the difference in the charge being held by the two capacitors to determine if the capacitance of one capacitor has changed. Richardson, col. 3, lns. 45-58; col. 4, lns. 11-19. The circuit disclosed in Richardson et al compares the charge held by a sensing capacitor (C3) to the charge held by a reference capacitor C_6. Richardson, col. 4, lns. 20-24, 56. The difference in the charges held by the two capacitors is the signal indicating a general displacement. By disclosing a sensor capacitor and a reference capacitor system (C_1, C_6), Richardson et al teaches away from the system recited in the claims of this application that rely on an output signal and input signal to measure a displacement.

There is no suggestion in the Richardson et al or Muller to substitute the Richardson circuit for the Muller circuit or to combine the references to form the claimed invention. Muller and Richardson et al do not address the same problem in the same way that is accomplished by the invention. In particular, the invention addresses problems associated with signal noise generated by the electronics processing the sensor signal. *See* Spec. para. 0003. The invention addresses this problem by combining a sensor output signal with an input signal to control the gain of an amplifier. This approach avoids a reference output signal and the associated electronics for processing a reference signal and comparing the reference signal to a sensor output signal. Muller and Richardson et al compare a reference output signal to a sensor output signal. Muller and Richardson et al appear to suffer the same signal noise problem addressed by

the present invention and cannot be said to render obvious the solution provided by the present invention.

The rejection of dependent claims 4, 5, 7 to 9, 13, 15 to 17, 27, 29 to 32, 35, 36 and 38 to 40 as being obvious over Muller and Richardson et al in view of Tardif et al (US Patent 6,307,385) should be reversed for the same reasons as stated above for their corresponding independent claims.

This application is in clear condition for allowance. It is respectfully requested that the rejections be withdrawn and the application be allowed.

Respectfully submitted,

NIXON & VANDERHYE P.C.

By: _____
Jeffrey H. Nelson
Reg. No. 30,481

JHN:glf
901 North Glebe Road, 11th Floor
Arlington, VA 22203-1808
Telephone: (703) 816-4000
Facsimile: (703) 816-4100